

Applicant further acknowledges the Examiner's characterization of the Office Action of August 20, 2002 as following the procedure under 37 CFR 1.129(a). However, it is noted that the present application was not pending two (2) years as of June 8, 1995. In fact, the international filing date is November 5, 1998. Accordingly, the Office Action of August 20, 2002 is being viewed as a further but non-final Office Action.

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Pending claims 4, 6, 7 and 10 are rejected as clearly anticipated by Fukano et al under 35 USC 102(e). This rejection is respectfully traversed.

According to the present invention a pipe joint is claimed made of resin such as fluororesin. The cylindrical projecting portion 8 of the inner ring 2 is pressingly inserted into the cylindrical groove 6 of the joint body 1, whereby a primary sealing portion is formed between the outer radial face 8b of the cylindrical projecting portion 8 and the inner peripheral face 4a of the receiving port 4; and a secondary sealing portion is formed between the tapered face 8a of the cylindrical projecting portion 8 and the tapered face 10b of the inner radial side cylindrical portion 10. A higher sealing pressure is generated in the sealing portions when the cylindrical projecting portion 8 is further pressingly inserted into the cylindrical groove 6. In conjunction with the above, the outer peripheral face 17a of the cylindrical portion 17 of the inner ring experiences a collapsing operation of the cylindrical projecting portion of the joint which is caused in the inner radial direction when the surface pressure of the secondary sealing portion is particularly high, so as to prevent the collapsing operation from occurring, and the interface between the outer radial face of the cylindrical portion 17 and the inner peripheral face of the inner radial side cylindrical portion 10 functions as a tertiary sealing portion.

The pipe joint of the present invention can achieve the following effects:

(1) Because of the three sealing portions, it is possible to surely prevent fluid from entering the inside of the joint such as the cylindrical groove. If fluid enters the inside of the joint, the fluid forms a liquid reservoir to largely lower the liquid replacement character, thereby causing contamination to adversely affect a wafer. Therefore, a pipe joint in which such a failure may possibly occur cannot be used in the field of semiconductor devices or the like.

(2) According to the invention, moreover, the cylindrical portion 17 experiences a collapse of the inner radial side cylindrical portion of the joint body as described above. Therefore, the press insertion state of the cylindrical projecting portion into the cylindrical groove is maintained, so that pressure reduction in the primary or secondary sealing portion due to deterioration with age is prevented from occurring as much as possible. As a result, the sealing performance can be maintained for a long time.

(3) Even in the case where resin creep inevitably occurs because of, for example, a use for a long term which is longer than the warranty period, a sealing pressure which is equal to the initial sealing pressure can be applied to the three sealing portions by further fastening the press ring member (because of this, as shown in Fig. 2 of the present application, for example, the screwing portion between the pressing ring 3 and the joint body 1 remains to have a marginal thread portion even when the fastening process is completed).

The present invention may be seemingly similar to **FUKANO** but is in reality entirely different therefrom.

FUKANO discloses a joint having a basic structure which is not provided with the secondary and tertiary sealing portions in the invention, and in which fluid is allowed to enter the

inside of the joint to some degree. In this way, at least, **FUKANO** is clearly different from the present invention.

FUKANO discloses that, as shown in Figs. 6 and 7, the portion which seemingly corresponds to the tertiary sealing portion of the present invention, i.e., the inner radial side cylindrical portion of the expanded section 38 is expanded in an outer radial direction by the pressure E of internal fluid, thereby changing the fifth surface 64 and the wall surface 60 of the annular projection 34 from the non-contacting state to the abutting state. The contact pressure of the abutting state naturally depends on the pressure E of the internal fluid. In the case where fluid of a pressure which is higher than a certain level flows through the joint, the inner radial side cylindrical portion of the expanded section 38 is sufficiently expanded in an outer radial direction by the pressure E of the internal fluid, so that the fifth surface 64 and the sixth surface abut against each other to form a sealing portion. By contrast, in the case where fluid of a low pressure flows, or where fluid is transported while producing pulsations in the vicinity of a pump, the inner radial side cylindrical portion of the expanded section 38 is insufficiently expanded in an outer radial direction by the pressure E of the internal fluid, with the result that a sealing portion is not formed.

FUKANO discloses a joint in which sealing against internal fluid is formed only by the primary sealing portion, and fails to *teach or suggest the secondary and tertiary sealing portions*.

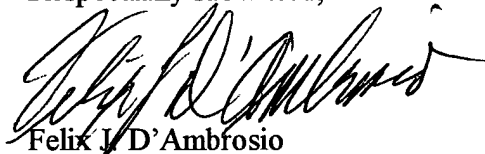
As a result, the joint of **FUKANO** has a structure in which the internal fluid can enter the first to third clearances in the joint, and hence cannot be used in a specific purpose, such as an apparatus for producing a semiconductor device, food, or a medicine.

In the joint of **FUKANO**, moreover, the inclined surface 52 of the annular projection 34 of the joint body 16 functions as a stopper for restricting the terminal end of the displacement portion of the insert bush 26, to prevent the insert bush from being further deformed. Therefore, the joint of **FUKANO** has a structure in which, even when the seal surface pressure is lowered by creep phenomenon or the like, the seal surface pressure cannot be restored by further fastening the nut member (this can be seen also from the structure shown in Fig. 1 in which the screwing portion between the nut member 22 and the joint body 16 do not have a marginal thread portion when the fastening process is completed.).

Claim 10 defines a secondary and tertiary sealing portion which, as noted above is missing in **FUKANO**. Without a teaching of these two additional sealing portions, **FUKANO** cannot, it is respectfully submitted, anticipate claims 10, or claims 4, 6 and 7 which depend therefrom.

In view of the foregoing, reconsideration and re-examination are respectfully requested and claims 10, 4, 6 and 7 found allowable.

Respectfully submitted,



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MARKED-UP COPY OF CLAIM 10

10. (Twice Amended) A pipe joint made of resin, comprising:

a sleeve-like inner ring which is to be pressingly inserted into one end portion of a pipe member to be integrated with said pipe member under a state where said inner ring is outward protruded in an axial direction from one end portion of said pipe member;

a joint body in which a cylindrical receiving port is formed in one end portion, an insertion portion of said pipe member into which said inner ring is pressingly inserted, being inserted into said receiving port; and

a pressing ring which is to be screwed to said one end portion of said joint body, presses said inner ring from an outer side of said pipe member by means of screw advancement toward said one end portion of said joint body, to cause a projected tip end portion of said inner ring to abut against an inner area of said receiving port of said joint body, thereby forming a sealing portion, wherein:

an inner radial face of said projected tip end portion of said inner ring is formed as a conical tapered face in which a diameter is larger when further moving toward an outer side in the axial direction of said inner ring,

a cylindrical groove is formed in an inner area of said receiving port of said joint body, said projected tip end portion of said inner ring including said conical tapered face being fitted in the axial direction in said cylindrical groove, and said cylindrical groove cooperates with [at least one of:] said conical tapered face to form a secondary sealing portion, and with a place on a side of an outer radial face of said projected tip end portion[,] to form [said] a primary

sealing portion,

the inclination angle of said conical tapered face of said projected tip end portion of said inner ring with respect to the axis is set to 5 to 20°, and

a cylindrical portion which abuts against an inner peripheral face of a cylindrical portion on an inner radial side of said cylindrical groove of said joint body is formed integrally with an inner radial side of said projected tip end portion of said inner ring, an outer peripheral face of said cylindrical portion abutting against said inner peripheral face of said cylindrical portion on said inner radial side to form a tertiary sealing portion.